

<i>Document Overview</i>
This lesson contains three activities that are designed to teach students about the physiological effects of nicotine on the brain, help kids understand how nicotine actually changes the neural connections within the brain leading to addiction and future drug use, and examine past and current social campaigns aimed at preventing teen tobacco use.
<i>Standards</i>
<p><u><i>Minnesota State Academic Science Standards</i></u></p> <ul style="list-style-type: none"> <li>○ 7.4.1.1.1 Recognize that all cells do not look alike and that specialized cells in multicellular organisms are organized into tissues and organs that perform specialized functions.</li> <li>○ 7.4.1.1.2 Describe how the organs in the respiratory, circulatory, digestive, nervous, skin and urinary systems interact to serve the needs of vertebrate organisms.</li> <li>○ 7.4.3.2.2 Use internal and external anatomical structures to compare and infer relationships</li> <li>○ 9.1.3.4.3 Select and use appropriate numeric, symbolic, pictorial, or graphical representation to communicate scientific ideas, procedures and experimental results</li> </ul>
<p><u><i>Next Generation Science Standards</i></u></p> <ul style="list-style-type: none"> <li>○ MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.</li> <li>○ MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.</li> <li>○ MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.</li> <li>○ HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</li> <li>○ MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.</li> </ul>
<u><i>Other Standards:</i></u>
<i>Objective</i>
<i>Students will understand the physiological changes nicotine has on the brain, visualize nicotine as a gateway drug that primes the brain for future drug use, and develop a social awareness campaign designed to prevent future teen tobacco use.</i>
<i>Type of Activity</i>
<i>Individual or Small Group with Large Class Activity and Discussion</i>

<i>Suggested Duration</i>
<i>1-2 Class periods (approx 45 minutes each)</i>
<i>Connection to Nobel Speakers</i>
<i>Denise Kandel: Nicotine as a gateway drug</i>
<i>Concepts/Keywords/Appropriate Classes</i>
<i>Nicotine, Neurotransmitter, Gateway Drug, Tobacco, Dopamine, Social Media, Peer Pressure, Advertising</i>
<i>Description of Activity</i>
<p><i>Part 1 - Preview</i></p> <p>Watch the original anti-drug commercial launched by the Partnership for a Drug Free American in 1987: <a href="#">"Your Brain on Drugs."</a></p> <p>After watching the video clip ask students to Think-Pair-Share the following questions:</p> <ol style="list-style-type: none"> <li>1. What actually happens to your brain on drugs?</li> <li>2. Are the impacts of drugs on your brain permanent?</li> <li>3. Why do people start using tobacco/drugs?</li> </ol> <p><i>Part 2A - Individual or Small Group Research and Project</i></p> <p>Show students the National Institute on Drug Abuse guide on nicotine addiction (<a href="http://teens.drugabuse.gov/educators/nida-teaching-guides/mind-over-matter/tobacco-addiction">http://teens.drugabuse.gov/educators/nida-teaching-guides/mind-over-matter/tobacco-addiction</a>)</p> <p>*This guide may also be downloaded as a PDF and printed for student use.</p> <p>Using the NIDA Resources, have students work individually or in pairs to complete this <a href="#">study guide</a>.</p> <p><i>Part 2B - <a href="#">Design a Social Campaign</a></i></p> <p>Starting with a preview of the 1987 <a href="#">"Your Brain on Drugs"</a> Anti-Drug Commercial, students work individually or in small groups to develop a scientifically accurate and relevant social campaign against teen tobacco use.</p> <p><i>Part 3 - Extension or Follow-up Activity</i></p> <p><a href="#">Nicotine/Candy Addiction Simulation</a></p>

<i>Materials</i>
<p>Computer and Internet Access</p> <p>Access to NIDA Website or Printed PDF of Nicotine Addiction Informational Guide</p> <p>1-2 Bags of Fun Size Candy (per class)</p>
<i>Teacher Tips</i>
<p><i>Similar Activity to Reinforce or Further Develop Students' Understanding of Neural Function</i></p> <p><a href="#">Neuron/Synapse Basics</a></p>
<i>Activity</i>
<i>See Description Above</i>
<i>Extension and Follow-up Activity</i>
<p><a href="#">Nicotine Simulation</a></p> <p><a href="#">NIDA Nicotine Extension and Quiz</a></p> <p><a href="#">NIDA Teen Drug Use Infographic 2014</a></p> <p><a href="#">NIDA "Why are drugs so hard to quit?" - Video</a></p>
<i>Sources/Bibliography</i>
<i>National Institute on Drug Abuse: Mind over Matter Teaching Guide and Series Tobacco Addiction</i>